

COMMONWEALTH OF VIRGINIA
Department of Environmental Quality
Northern Regional Office

STATEMENT OF LEGAL AND FACTUAL BASIS

Mirant Potomac River Generating Station
Alexandria, Virginia
Permit No. 70228

State Operating Permit

DRAFT

I. Purpose

The Virginia Department of Environmental Quality (VDEQ) – Division of Air Quality has been requested by the State Air Pollution Control Board (Board) to develop a comprehensive State Operating Permit which establishes emission limitations for sulfur dioxide (SO₂), nitrogen oxides (NO_x), total particulate matter (PM), particulate matter equal to or less than ten microns (PM₁₀), volatile organic compounds (VOC), carbon monoxide (CO), and the acid gases hydrochloric acid (HCl), and hydrogen fluoride (HF) on both a short-term and an annual basis that are protective of the National Ambient Air Quality Standards (NAAQS) for the operation of five coal-fired boilers at the Mirant Potomac River, LLC's Potomac River Generating Station (PRGS) facility. This document sets forth the background information used to create a record of the engineering evaluation for the proposed permit. The permit also requires the use of Continuous Emission Monitor Systems (CEMS) for SO₂, NO_x, (CO), carbon dioxide (CO₂) and/or oxygen (O₂), to demonstrate compliance with all emission limitations of this State Operating Permit.

II. Facility Background

The PRGS is a 482-MW electricity generating facility located on the Potomac River in Alexandria, Virginia. Mirant Potomac River, LLC (formerly Southern Energy Potomac River, LLC) purchased the PRGS from the Potomac Electric Power Company (PEPCO) in December 2000. Electricity generated at the facility is transmitted to the Pennsylvania/New Jersey/Maryland (PJM) distribution grid and services Washington D.C. for use by a variety of customers including federal agencies, businesses, residences, and the D.C. Water and Sewer Authority's Blue Plains Wastewater Treatment Plant.

The facility consists of five tangentially-fired boilers (designated as boilers C1, C2, C3, C4, and C5), each supplying steam to a boiler specific steam turbine connected to a dedicated electrical generator for that boiler. Each boiler utilizes coal as the primary which is delivered by rail car to the facility. Boilers C1 and C2 are cycling boilers that offer more flexibility in how they are dispatched. Cycling boilers can be brought online quickly to respond to increases in demand. Boilers C3, C4 and C5 are considered base load boilers

and are called into service more often than boilers C1 and C2. The base load boilers typically run 24 hours a day. In addition to the primary fuel, No. 2 fuel oil is stored in two aboveground storage tanks and is used to provide ignition, warm-up, and flame stabilization for the boilers.

Each boiler's gas stream is discharged into the atmosphere through a dedicated stack for that boiler. The five stacks are identical and are each 161 feet above ground level.

Summary of PRGS Combustion Boilers

Boiler ID	Manufacturer	Description	Maximum Rated Input Heat Capacity (MMBtu/hr)	Generation Capability (MW)	Began Service
C1	Combustion Engineering, Inc.	Natural circulation, tangentially coal-fired with superheater and economizer	1053	93	1949
C2	Combustion Engineering, Inc.	Natural circulation, tangentially coal-fired with superheater and economizer	1029	93	1950
C3	Combustion Engineering, Inc.	Controlled circulation, tangentially coal-fired with superheater, single reheater and economizer	1018	108	1954
C4	Combustion Engineering, Inc.	Controlled circulation, tangentially coal-fired with superheater, single reheater and economizer	1087	108	1956
C5	Combustion Engineering, Inc.	Controlled circulation, tangentially coal-fired with superheater, single reheater and economizer	1107	108	1957

The facility is a Title V major source of sulfur dioxide (SO₂), nitrogen dioxide (NO₂), particulate matter equal to or less than ten microns in diameter (PM₁₀), and carbon monoxide (CO). This facility is also located in a nonattainment area for the 8-hour ozone standard ("moderate" classification) and a nonattainment area for particulate matter equal to or less than 2.5 microns in diameter (PM_{2.5}) (no classification assigned by EPA at this time). The area is in attainment of the standards for all other pollutants. The VDEQ

Northern Regional Office is currently drafting the Title V permit and Statement of Basis for the facility.

Because the boilers were constructed between 1949 and 1957 and the requirements of 40 CFR 60, Subparts, D, Da, and Db were not effective for units earlier than August 17, 1971, these units are “grandfathered”, therefore there are no NSR permits applicable to this source. The facility entered into a consent order with VDEQ on July 10, 1998, to establish Reasonable Available Control Technology (RACT) for NO_x as required by the Virginia State Implementation Plan. A state operating permit dated June 5, 2000, was issued to the facility to establish RACT for VOC. The facility is also regulated under a Phase II Acid Rain Permit dated February 28, 2003, and a State Operating Permit dated September 29, 2000, for control of NO_x during the ozone control season, May 1st through September 30th. In 2005 the facility submitted modeling results from the “downwash study” which indicated an exceedances of the SO₂ NAAQS. As a result of this modeling result the facility was issued a administrative consent order by EPA which required that modeling be conducted each day and the operational scenarios developed for the following day’s operation which would insure that the NAAQS would not be exceeded. This operational requirement expired on May 31, 2007 and VDEQ issued a State Operating Permit dated June 1, 2007, that sets hourly limits on SO₂ and an annual SO₂ limit of 3813 tpy.

II. Pollution Controls

Each boiler (C1, C2, C3, C4, and C5) has a hot-side and a cold-side electrostatic precipitator (ESP) on its boiler exhaust gas stream to control particulate emissions.

Mirant installed Low-NO_x Burners (LNB) on all boilers (C1, C2, C3, C4, and C5) and Separated Over-Fire Air (SOFA) technology on boilers C3, C4, and C5 as a result of a 2004 judicial consent decree. This consent decree became enforceable on April 20, 2007.

The use of LNB’s limit the formation of NO_x by controlling the stoichiometric and temperature profiles of the combustion process in each burner zone. Emissions are controlled by the design of the LNB which may reduce oxygen levels in the combustion zone (limits fuel NO_x formation), reduce flame temperature (limits thermal NO_x formation), and/or reduce residence time at peak temperature (limits thermal NO_x formation).

SOFA is a technique that involves removing a percentage of combustion air and adding excess air above the burners. This limits thermal NO_x by partially delaying and extending the combustion process resulting in less intense combustion and lower flame temperatures. It also suppresses the fuel NO_x formation by reducing the concentration of air in the combustion zone where volatile fuel nitrogen is evolved. SOFA can reduce NO_x by 20 to 30 percent from uncontrolled levels and can be turned off.

Beginning in 2005 Mirant employed the use of Trona to reduce SO₂ emissions from the facility, which dispersion modeling had shown to be a contributor to a predicted

exceedance of the NAAQS. Trona is a naturally occurring mineral (sodium sesquicarbonate), which is non-flammable and similar to baking soda. It has been used in dry sorbent injection systems where it reacts with acid gases to form a non-corrosive product that will not damage the equipment. When injected into the combustion exhaust gas stream, the dry powder also forms a bond with SO₂. The compounded particulate material is then removed from the exhaust gas by existing emissions control equipment and collected with the ash. Test results at PRGS indicate that Trona injection could consistently remove a significant portion of the SO₂ from exhaust gas, increase the efficiency of the control device in reducing particulate emissions, and provide a reduction in the acid gases HCl and HF. Particulate matter can also form in the atmosphere with the emitted gases, such as sulfur dioxide which will condense to create sulfate particles; so when the amount of sulfur dioxide decreases, the amount of condensable particulate matter is reduced accordingly.

III. Permit Description

<u>Permit Condition</u>	<u>Purpose and Basis of the Condition</u>
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| 1. | Specifies the emitting boilers and potential pollution sources to which the permit conditions apply. In this case, the boilers are all of the boilers supplying steam for electric power generation. |
| 2. | Specifies the stack configuration and how the various boilers will be connected to the merged stacks. |
| 3. | The type of NO _x emissions control (low-NO _x burners) required for boilers C1 and C2 are specified in this condition. |
| 4. | The type of NO _x emissions control (low-NO _x burners and separated over-fire air; SOFA), required by the Consent Decree, that has been installed on C3, C4, and C5 are specified in this condition. |
| 5. | Describes the emission control for SO ₂ and acid gases. |
| 6. | Describes the procedures to be followed should an alternate dry sorbent be requested by the permittee. |
| 7. | Describes the emission controls for PM from the boilers C1 through C5. |
| 8. | Describes the emission controls for PM from the two fly ash silos. |
| 9. | Describes the emission controls for PM from the bottom ash silo. |
| 10. | Describes the emission controls for PM from fly ash and bottom ash truck or train transfer operation. |
| 11. | Describes the emission controls for PM from the coal handling operations. |
| 12. | Describes the emission controls for PM from the railcar dumping facility. |

13. Describes the emission controls for PM from the dry sorbent handling systems.
14. Describes the electrostatic precipitator's designations and operational requirements.
15. Describes the fugitive dust control requirements for the facility.
16. Requires for the installation, certification, operation, and maintenance of the opacity monitoring systems on the two merged stacks. States compliance with opacity limits in the State Operating Permit may be determined by continuous opacity monitoring. Mirant already has continuous opacity monitors and with the recent incorporation in the Virginia regulations the opacity monitors may now be used as a direct compliance tool.
17. Requires the installation continuous emissions monitoring systems (CEMS) for SO₂, NO_x, O₂ or CO₂, and flow on each of the two merged stacks. States that compliance will be determined by and specifies the requirements for installation, operation, maintenance, and quality assurance of the CEMS.
18. Requires the permittee to submit a plan to DEQ within 12-months of the effective date of the permit for the installation, operation, maintenance, and quality assurance for PM CEMS. Also, within this condition there is a requirement to collect six months of CO data to be used in establishing a permitted CO emission limit.
19. Requires the permittee install CO CEMS on each of the merged stack as part of the stack merge project to meet the requirements of 40 CFR Part 60 Appendix B. Certification and reporting requirements are also included in this condition. A six month data gathering requirement is included after which the emission factor of the determination of compliance will be reevaluated.
20. Requires monthly determinations of emissions of PM, PM₁₀, VOC, HCL, and HF.
21. Sets the requirement to operate, maintain, and record the pressure drop across the fabric filters installed on the fly ash and bottom ash silos.
22. Requires that the permittee conduct a condition assessment of the hot and cold side ESP's on a daily basis. This assessment is required to insure that the ESP's are in proper operating condition.
23. Requires the permittee to make daily evaluations of the monitoring devices installed to insure the proper operation and that all emission sources are within the limits set forth in this State Operating Permit. This condition also specifies corrective action to be taken by the permittee should malfunctions or exceedance be discovered.
24. Specifies the approved fuel.
25. Sets the specification of all fuels and the analysis method accepted by DEQ.
26. Requires the permittee to obtain and maintain fuel certifications from the fuel suppliers. The information required in this certification is also delineated.

27. Establishes the short term emission limits for Merged Stack 1 and Merged Stack 4. Emissions are prescribed specific to the pollutant and the averaging period for that pollutant. These limits are derived from the estimated overall emission contribution from the operating limits. Emission limitations have been established based on the most up to date atmospheric dispersion modeling utilizing AERMOD (Model Version 07026) and uses (Equivalent Building Dimensions) as input to the model. The EBD were derived from a wind tunnel study which was specific to the building.
28. Establishes annual emission limits for the facility. These limits are derived from the estimated overall emission contribution from the operating limits. Annual emissions are capped at 3,813 tons of SO₂ from the facility as established in the June 1, 2007 State Operating Permit and set out in Condition 30 of this State Operating Permit. Additionally, annual emissions of NO_x are capped at 3,700 tons per year from the facility and are set out in Condition 30 of this State Operating Permit. Furthermore, the facility is limited to 1,600 tons of NO_x during the ozone seasons (effective until December 31, 2008). These conditions are set in Condition 30 of this State Operating Permit.
29. Requires the permittee to calculate the total annual emissions from two merged stacks monthly as the sum of each 12-month period.
30. Establishes the method for calculating the annual emissions of CO until twelve months of CEM data has been accumulated. Once twelve months of data has been accumulated the permittee shall follow the same procedures and the collected data from the other CEMS
31. Establishes visible emission limits for Merged Stack 1 and Merged Stack 4 and the methods to be used in this determination. With the adoption of the Virginia law effective July 2007, the use of COMS as a direct compliance tool is specified in this condition.
32. Defines performance testing, notification, and reporting requirements for Merged Stack 1 and Merged Stack 4 for SO₂, NO_x, PM, PM₁₀, PM_{2.5}, CO, HCL, and HF. Additionally, there are specific requirements for data collection during the performance test which will be used as future surrogate to determine control device operation. Also, should the permittee elect to use a lower fuel sulfur content in the coal, there are specific requirements defined for the approval of this fuel switch.
33. Defines initial visible emission evaluation procedures for Merged Stack 1 and Merged Stack 4. The optional methods, as stated earlier, are allowed in this condition and the notification and reporting requirements are established.
34. Establishes the requirements for initial performance evaluations of the CEMS and COMS.
35. Establishes the requirements quality control program of the CEMS and COMS to include the need for annual relative accuracy test audits (RATA).

36. Establishes the requirement to conduct annual compliance testing on PM, PM₁₀, PM_{2.5}, HCL, and HF
37. Requires that the permittee conduct air quality analysis of PM 2.5 once guidelines have been by the US EPA or DEQ.
38. Defines and establishes the requirement for record keeping. A proposed listing of records to be maintained by the facility and the authority to use off-site electronically stored data is included, as long as the data is accessible from the facility.
39. Establishes requirements for submitting quarterly CEM reports.
40. Establishes requirements for the permittee to submit semi-annual emission reports.
41. Establishes requirements for the permittee to notify the DEQ under specific conditions
42. Authorizes local, state, and federal representatives the right to enter the facility to assess the status of compliance.
43. Requires the facility to operate and maintain the boilers and emission control equipment in a manner consistent with good air pollution control practices for minimizing emissions as defined in this permit. Within this condition the permittee is required to maintain records and parts to meet the intent of the condition.
44. Requires maintenance of records of occurrences and duration of specific conditions which would result in an emission exceedance of a specific duration and any action resulting from this activity.
45. Requires the permittee to notify DEQ of any equipment or control equipment malfunctions and sets the time requirements and information to be included for these notifications.
46. Requires the permittee to reduce the level of operation or shut down the boilers if the Board determines this is necessary to prevent the violation of any NAAQS.
47. Defines conditions in which the permit may be revoked.
48. Requires that the permittee notify any new owner of the facility about this permit and sends a copy of the notice to DEQ. The DEQ would then make the necessary administrative amendments to the permit to show that it is transferred to the new owner.
49. States that a copy of the permit must remain on the premises. Besides being a regulatory requirement, it serves as a reminder to the facility staff of other obligations as well as assuring the availability of inspection of the permit by DEQ personnel and others.

IV. Best Available Control Technology Review (BACT) Applicability (9 VAC 5-50-260)

A BACT applicability evaluation is not required for State Operating Permits.

V. New Source Performance Standards (NSPS)-9 VAC 5 Chapter 50, Part II, Article 5

The PRGS is not subject to 40 CFR 60 Subpart D – Fossil Fuel Steam Generators or to Subpart Da – Electric Utility Steam Generating Units. Both NSPS apply to fossil fuel-fired steam generators that are greater than 250 MMBtu/hr and that commenced construction or modification after August 17, 1971, for Subpart D and September 18, 1978, for Subpart Da. Additionally, the PRGS is not subject to 40 CFR Subpart Db because all of the boilers began construction prior to June 19, 1984. All five boilers at the PRGS were constructed between 1949 and 1957 and have not previously been subject to either NSPS. Modification is defined in the NSPS regulations as physical or operational changes that result in an increase in hourly rates of emissions.

VI. National Emission Standards for Hazardous Air Pollutants (NESHAPS) - 9 VAC 5 Chapter 60, Part II, Article 1 –

There is no applicable NESHAP for steam generating units.

VII. Maximum Achievable Control Technology (MACT) - 9 VAC 5 Chapter 60, Part II, Article 2

There are no applicable MACT requirements for steam generating units.

VIII. Future Applicable Requirements

The PRGS will be subject to the NO_x requirements of the Clean Air Interstate Rule (CAIR) on January 1, 2009. The Clean Air Mercury Rule (CAMR) and the SO₂ requirements of CAIR are effective on January 1, 2010. Under Phase I of CAIR, the facility will be allocated 711 tons of NO_x emissions during the ozone season, 1,734 tons of NO_x annually, and 6,025 tons of SO₂ annually. The facility will be allocated 72.37 lbs of mercury under Phase I of CAMR.

The facility will not be subject to the requirements of Best Available Retrofit Technology (BART) in EPA's Regional Haze Rule because all boilers were constructed between 1949 and 1957 and the BART applies to units constructed after August 7, 1962 but prior to August 7, 1977.

IX. Toxic Pollutants

The facility is not subject to the state toxics rule. Regulation 9 VAC 5-60-300 C.5 exempts stationary sources that EPA has made a formal determination will not be regulated under

§112 of the Clean Air Act. The facility will be subject to CAMR which is established under §129.

X. Title V Review - 9 VAC 5 Chapter 80, Article 1

The facility is a Title V major source of sulfur dioxide (SO₂), nitrogen dioxide (NO₂), particulate matter (PM₁₀), and carbon monoxide (CO). The DEQ-Northern Regional Office is currently drafting the Title V permit and Statement of Basis for the facility. All applicable requirements resulting from this State Operating Permit will be incorporated into the Title V permit.

XI. Public Participation

Following a comment period, a public hearing will be held on January 25, 2008. The public comment period will begin on December 21, 2007, and conclude on January 29, 2008.

XII. Other Considerations – Air Quality Modeling

Due to the size of the air quality modeling files and documentation, specific requests for these data may be directed to Monica Harvey at (804) 698-4300 or maharvey@deq.virginia.gov.